WATER RESOURCES RESEARCH GRANT PROPOSAL

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Title: Evaluation of Conductive Properties of the Surficial Aquifer in the Nebraska Sand Hills

Focus Categories: Hydrology, None

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Abstract

Hydraulic properties of the aquifer underlying the Nebraska Sand Hills control water availability and quality in an area of 50,000 km2. Deposited by eolian processes, this dune field serves as a water buffer that preserves precipitation and conveys a part of it to the underlying alluvial sand, gravel, and silt, and further to the High Plains aquifer. Hydraulic conductivity is the major property of this buffer that controls groundwater recharge. However, surprisingly little is known about the hydraulic conductivity of this dune field. Therefore, it is important to develop methodology and to initiate studies of hydraulic conductivity in the Sand Hills that will provide the field data needed for evaluation of water resources and water quality of the region. Specific objectives include the development of new methodology for estimation of permeability by air injection (equipment, procedures, and data interpretation), field validation of the methodology by comparing data with hydraulic testing results (slug test) in pre-existing wells, and evaluation of hydraulic conductivity and its patterns in characteristic dune areas over the shallow aquifer of the Nebraska Sand Hills. The developed methodology will have also broader scientific ramifications by providing a tool for field investigations of conductive properties in unconsolidated aquifers in unsaturated conditions.